

REMARKS/ARGUMENTS

The specification and claims have been carefully reviewed in the light of the Office Action to which this amendment is responsive. By this amendment, claims 19-20, 22-23, 28-31, 33, and 37-39 have been canceled without prejudice to reduce issues, and independent claims 21 and 32 have been amended to improve their form and to distinguish even more clearly over the prior art. A substitute declaration in the form attached, which is believed to correct the informality noted by the Examiner, has been forwarded for execution by the inventors and will be filed promptly upon return.

Claims rejected on grounds of new matter under 35 U.S.C. § 251 have been canceled, except for claims 40-41 that call for the inlet, storage, and payout regions of the deep drawn metal yarn feed wheel to have uniform wall thicknesses, which are believed to be supported by FIGS. 15-17 of the drawing, as well understood by a knowledgeable person familiar with the deep drawing of metal bodies from a metal blank. Reconsideration and withdrawal of the new matter rejections with respect to those claims is respectfully requested.

An effort also has been made to correct the recapture objection raised by the Examiner with respect to the apparatus claims. Reconsideration of the recapture objections with respect to the method claims is respectfully requested. It is well established that claims to distinct inventive species may be submitted by way of a reissue application due to inadvertent failure to file a divisional or continuation application so long as a requirement for restriction had not been issued in the original application. (M.P.E.P. 1412.01, page 1400-18) Likewise, when reissue claims are claiming additional inventions or species not originally claimed, recapture will not be present: “If, however, the reissue claim(s) are really claiming additional inventions/embodiments/species not originally claimed (i.e., overlooked aspects of the disclosed invention), then recapture will not be present” (M.P.E.P. 1412.02, page 1400-21) Hence, the patentee may file a reissue application covering previously unpresented process claims, even though it is a broadening reissue. (M.P.E.P. 1412.02 II, page 1400-25) Such application, as in this case, must be filed within two years of the grant of the original patent. In this case, claims 32-41 are directed to an invention distinct from the product claims. In fact, the claims are substantially narrower in scope than the original product claims since they only cover one very specific method of making the product, and for this reason also, the recapture rule is avoided. (M.P.E.P. 1412.02 C, page 1400-21) Moreover,

in this case, the recapture rule has no practical application since due to the distinct inventive forms, elements of a product claim are distinctly different from process steps. Hence, withdrawal of the recapture objections with respect to claims 32-41 is requested.

With respect to prior art rejections, at the outset the Examiner has rejected the original patent claims over the same art that was of record and relied upon in the prosecution of the original application. Patent claim 1, which is not limited to the material of the yarn feed wheel, effectively has been rejected over Fecker U.S. patent 4,793,565. For the reasons set forth in the original prosecution, which need not be repeated herein, the original claims are believed to clearly distinguish over that and the other prior art of record. (See Response to Office Action filed November 21, 2002, p. 6) Withdrawal of such rejection again is requested.

Reissue claim 21 similarly is believed to distinguish over the prior art, and further calls for the yarn feed apparatus wheel to comprise a single piece thin walled metal body deep drawn and shaped from a metal blank. Reissue claim 32 is specifically directed to a method of making a yarn feed wheel comprising the steps of providing a metal blank, and deep drawing the metal blank in one or more shaping steps to form a single piece thin walled metal body in the specific form recited. The Examiner has rejected these claims as being unpatentable over Fecker (US 4,793,565) in view of Buck et al. (US 4,574,597), and reconsideration of that rejection also is requested.

Independent claims 21 and 32 are respectively drawn to a single piece yarn feed wheel and method of manufacture utilizing a deep drawn and shaped metal body formed with yarn inlet, storage, and payout regions that merge smoothly with one another without shoulders, steps, or interruptions that can impede lateral movement along the yarn feed wheel. Fecker discloses a yarn feed wheel which comprises several pieces which are assembled together with the desired cage construction. Clearly there is an upper disk, a lower disk, and pins 16 therebetween. Persons skilled in the art would understand it is not possible to create such structure by deep drawing a piece of sheet metal. While the Examiner indicates the Buck et al. teaches forming a yarn feed wheel by deep drawing, this simply is not the case. Buck et al. lacks any disclosure in that regard, and a person skilled in the art, would appreciate that the Bucket al. wheel construction likely would be manufactured by die casting, milling, or the like. The shape of the drum cannot be produced by deep drawing a

single piece of metal. Nor does the wheel in Buck et al. have the other important features of the claimed invention, as set forth in claims 21 and 32, in which the yarn inlet, storage, and payout regions merge smoothly with one another without shoulders, steps, or interruptions.

While deep drawing is a well known manufacturing process, the unobviousness of the present invention is further evidenced by the manufacturing precision necessary for yarn feed wheels. For example, one must bear in mind that the yarn delivery wheel controls the quality of the knit wear produced on a circular knitting machine. The yarn delivery wheel precisely defines the amount of yarn which can be consumed by each loop formed during the knitting process at the knitting machine. In other words, the amount of yarn the yarn delivery wheel supplies will define the size of the loops formed by the knitting tools. If the yarn delivery wheel is not absolutely concentrically located at the shaft, i.e., if the wheel has some degree of eccentricity, the amount of yarn delivered in one turn of the yarn delivery wheel can fluctuate. This will periodically increase and decrease the size of the loops formed at the circular knitting machine, which is not acceptable. The size of the loops of the knit wear has to be uniform, and indeed, a loop size of one millimeter will require precision. A quarter of the stitch size (25% of the stitch size) is only 0.25 mm. This highlights the precision requirements which must to be fulfilled.

In short, a person skilled in the art would not easily think of applying an inexpensive manufacturing process, such as deep drawing, to the formation of such precision yarn delivery wheels. Indeed, the lack of teachings in the prior art demonstrates the unobviousness of that concept, notwithstanding its cost and other advantages.

Furthermore, the specific shape of the yarn feed wheel, as specifically defined in independent claims 21 and 32, would dictate against the use of a deep drawing process. As well understood by persons skilled in the art, deep drawing starts from a planar piece of sheet metal the rim of which is clamped between clamping surfaces of a press forming tool. The sheet metal clamped this way will then be pushed over a male tool while a female part of the die receives the work piece. However, as seen in FIG. 13, the shape of the yarn delivery wheel requires a male and a female tool which both comprise radially movable elements. This is due to the fact that the payout region extends conically outwardly. Consequently, someone having ordinary skill in the art would at first would reject the idea producing the

claimed structure by deep drawing. Certainly, it was not suggested in the prior art and would not have been obvious to a person skilled in the art.

From the foregoing, it is believed that the claims as now presented all patentably distinguish over the prior art and are otherwise in condition for allowance. Accordingly, an early action to that effect is respectfully requested.

If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



Dennis R. Schlemmer, Reg. No. 24,703
LEYDIG, VOIT & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson Avenue
Chicago, Illinois 60601-6731
(312) 616-5600 (telephone)
(312) 616-5700 (facsimile)

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<p>18. (New) The yarn feeder of claim 1 in which said yarn feed wheel comprises a one-piece body that is deep drawn and shaped from a metal blank.</p>	
<p>19-20. (Canceled)</p>	
<p>21. (New) A yarn feeder machine comprising a rotatably mounted yarn feed wheel for positively feeding yarn through the machine,</p> <p>a drive mechanism having a drive shaft for rotatably driving said yarn feed wheel,</p> <p>said yarn feed wheel comprising a single-piece, seamless, hallow, metal body deep drawn and shaped from a metal blank,</p> <p>said body including a laterally extending yarn inlet region, a laterally extending yarn storage region having a diameter less than the inlet region about which yarn is wound, and a laterally extending yarn payout region; said yarn inlet region having a shape that decreases in a lateral direction toward the storage region;</p> <p>said body having an end wall that merges into said yarn payout region and is formed with an opening along a central axis of the yarn feed wheel for receiving said drive mechanism drive shaft, said body being open at an end opposite said end wall;</p> <p>said yarn inlet region having a circular cross section at each lateral point that is concentric to the central axis with a diameter which decreases along the central axis in a lateral direction toward the storage region,</p> <p>said payout region extending in a lateral direction away from said storage region and having a circular cross section at each lateral point that is concentric to the pivot axis with a diameter which increases along the pivot axis in a lateral direction away from the</p>	<p>Patent claim 1</p> <p>Patent claim 1, Spec. p. 6, l. 28</p> <p>Spec. p. 4, l. 31 – p. 5, l. 13; p. 10, ll. 10-11, 23-26; p. 11, ll. 1-2; FIG. 16</p> <p>Patent claim 1</p> <p>FIG. 11; Spec. p. 10, ll. 26-28</p> <p>FIG. 11</p> <p>Patent claim 1</p> <p>Patent claim 1</p>

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<p>storage region such that yarn wound onto the wheel can laterally progress from the yarn inlet region, across the yarn storage region, and away from said yarn payout region; and</p> <p> said yarn inlet region, yarn storage region, and payout region merge smoothly with one another without shoulders, steps, or interruptions which can impede lateral movement of yarn from the inlet region to the storage region and from the storage region to the outlet region.</p>	<p>Patent claim 1</p>
<p>22-23. (Canceled)</p>	
<p>24. (New) The yarn feeder of claim 23 in which the diameter of said yarn storage region is defined by the outer perimeter of a plurality of circumferentially spaced ribs.</p>	<p>Patent claims 11 and 12 FIG. 11</p>
<p>25. (New) The yarn feeder of claim 21 in which said yarn feed wheel has an outer protective coating.</p>	<p>Patent claim 16</p>
<p>26. (New) The yarn wheel of claim 25 in which said outer coating is enamel, ceramic, sapphire, quartz, diamond-containing material, nitride or carbide.</p>	<p>Patent claim 14</p>
<p>27. (New) The yarn feed wheel of claim 21 in which said body is formed of aluminum.</p>	<p>Spec. p. 10, ll. 15-20</p>
<p>28-31 (Canceled)</p>	
<p>32 (New) A method of making a yarn feed wheel comprising the steps of providing a metal blank, and</p> <p> deep drawing the metal blank in one or more shaping steps to form a single-piece, seamless, hallow, metal body that includes an end wall with a central opening for receiving a drive shaft, a yarn inlet region,</p>	<p>Spec. p. 4, l. 31; p. 11, l. 11</p> <p>Spec. p. 4, l. 31 – p. 5, l. 3; p. 10, ll. 10-11, 23-28; p. 11, ll. 1-2; FIG. 16</p>

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<p>a laterally extending yarn storage region having a diameter less than the diameter of said yarn inlet region about which yarn can be wound, and a laterally extending yarn payout region adjacent an end of said body opposite said yarn inlet region with walls of said regions merging smoothly without shoulders, steps or interruptions which can impede lateral movement of yarn from the inlet region to the storage region and from the storage region from the storage outlet region.</p>	<p>Patent claim 1 Patent claim 1</p>
<p>33. (Canceled)</p>	
<p>34. (New) The method of claim 32 including coating said one-piece metal body after said shaping steps.</p>	<p>Spec. p. 10, ll 10-18</p>
<p>35. (New) The method of claim 33 including providing said metal blank made of aluminum.</p>	<p>Spec. p. 10, ll 10-18.</p>
<p>36. (New) The method of claim 35 including coating said metal body after said shaping steps with enamel, ceramic, sapphire, quartz, diamond-containing material, nitrate or carbide.</p>	<p>Patent claim 4</p>
<p>37-39. (Canceled)</p>	
<p>40. (New) The yarn feeder of claim 21 in which said inlet, storage and payout regions each have a uniform wall thickness.</p>	<p>FIGS. 15-17</p>
<p>41. (New) The method of claim 32 including forming said inlet, storage, and payout regions of said body with a uniform wall thickness.</p>	<p>FIGS. 15-17</p>